United States Patent

[11] 3,600,864

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[54] **PRECAST PANEL, BUILDING WALL CONSTRUCTION AND METHOD**
2 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **52/495,** 52/314
[51] **Int. Cl.** **E04b 2/58**
[50] **Field of Search** 52/314, 434, 495, 741, 742

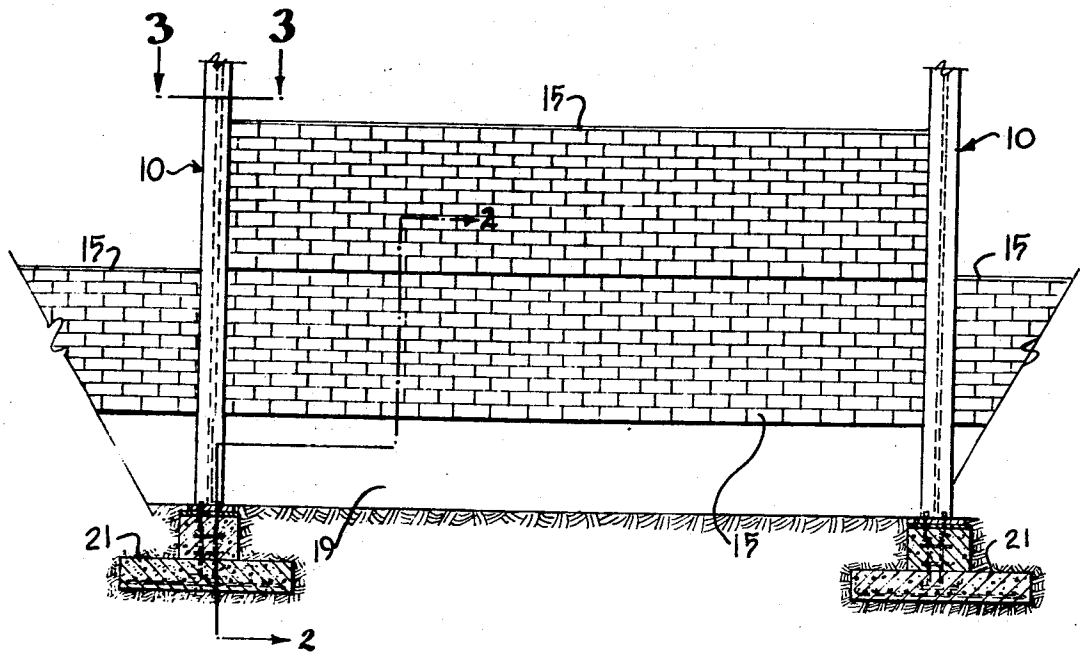
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Primary Examiner—Alfred C. Perham
Attorney—Parrott, Bell, Seltzer, Parker & Gibson

ABSTRACT: A precast panel, building wall and method of erecting the same wherein the panels are mounted to extend between adjacent pairs of column members for forming the entire thickness of a building wall intermediate the adjacent column members and with distal end portions of the panels received within a corresponding pair of opposing, facing channels in the column members, the panels being secured in place within the column members by clamping means engaging the panels and the column members.



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SHEET 1 OF 2

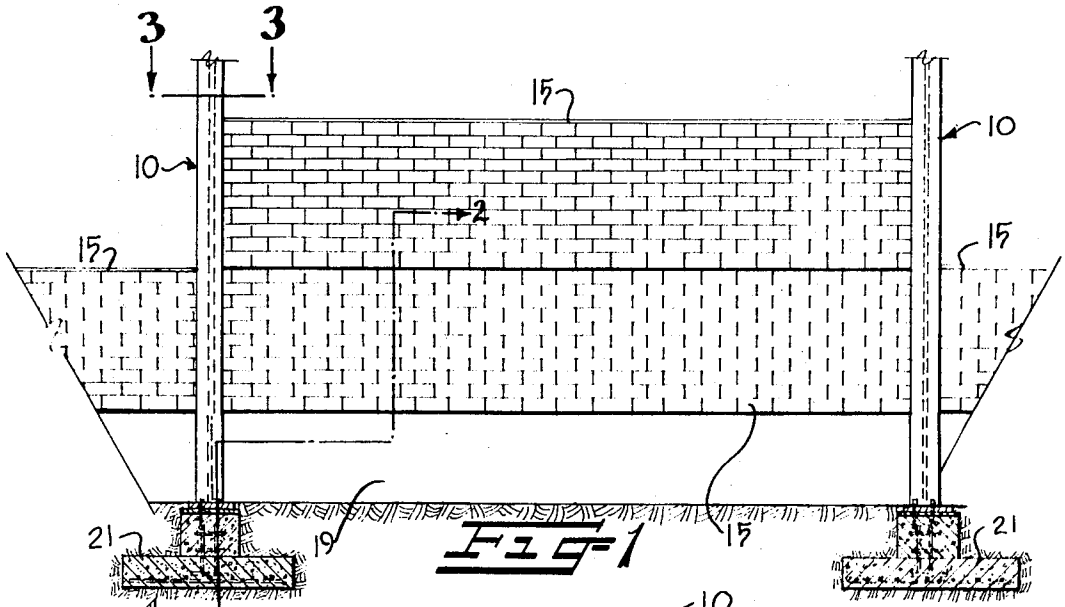


FIG-1

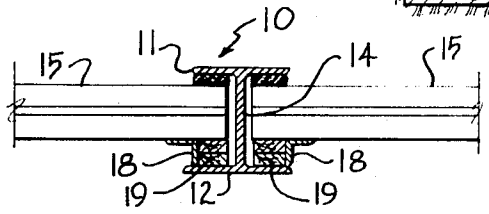


FIG 3

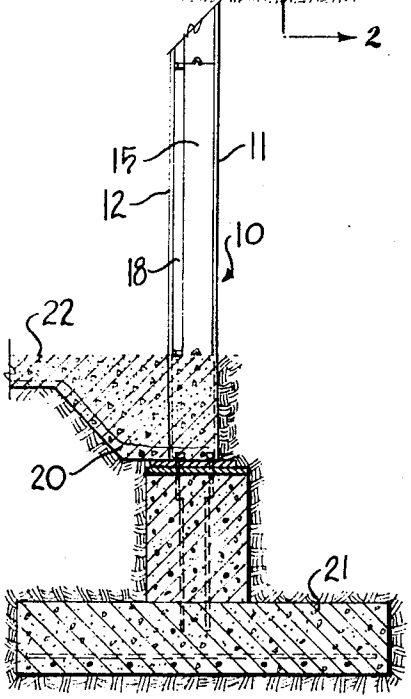


FIG-2

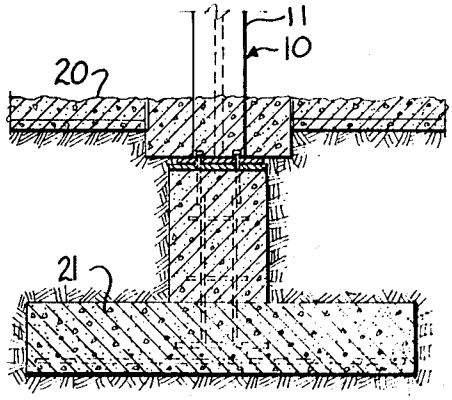


FIG-4

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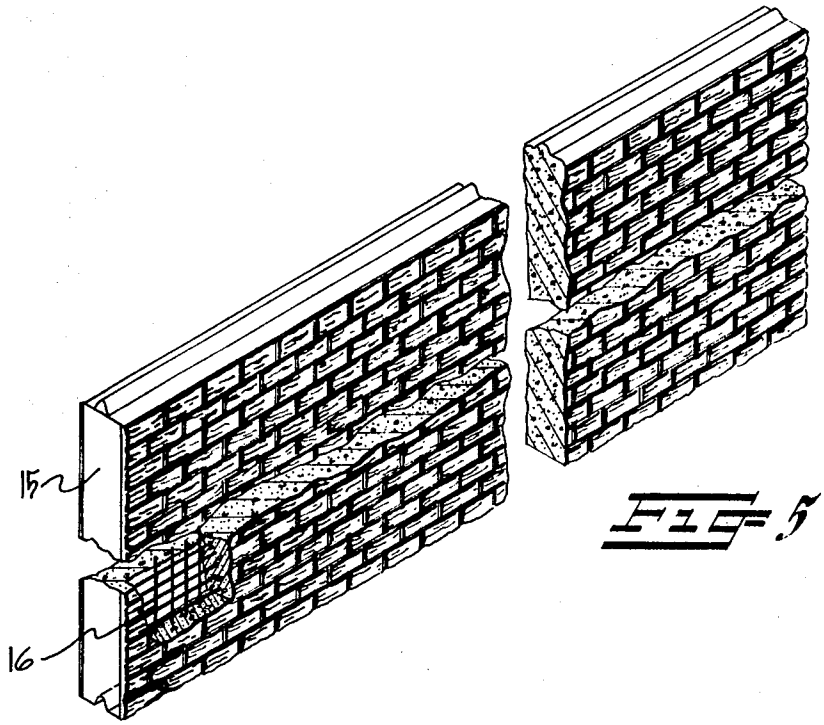


FIG. 5

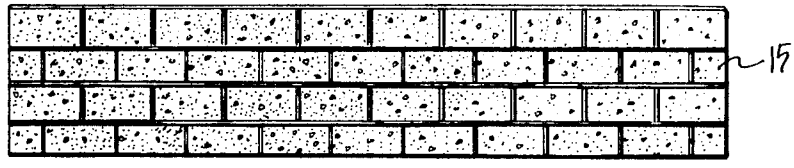


FIG 6

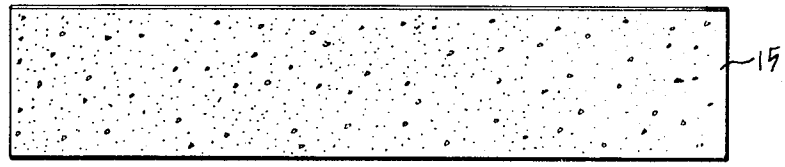


FIG 7

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PRECAST PANEL, BUILDING WALL CONSTRUCTION AND METHOD

This invention relates to building wall constructions, a precast panel useful in such construction, and a method of erecting the same.

One style of construction used for light industrial and other commercial buildings such as warehouses, motels and small equipment manufacturing buildings involves laying up walls of masonry units such as face brick for the interior surface of the wall. While such a style of building wall construction has in the past been sufficiently economical to lead to its wide adoption, and has become well known to and generally accepted by tenants and buyers of buildings of the type described, a certain economic difficulties have recently developed in the erection of such buildings. In particular, the handlaying of masonry units such as face brick and cement block has become increasingly expensive as the wage rates of masons have risen. At the same time, materials costs have also risen and competition from alternative types of construction such as steel buildings has increased.

Having the foregoing in mind, it is an object of the present invention to achieve the well known and accepted appearance of conventional handlaid masonry wall constructions while also accomplishing significant savings over that type of construction. In accomplishing this object, a method is followed whereby precast panels are formed and erected to act as substantially the entire wall area of a building, while imparting to the building as appearance comparable to that of conventional handlaid masonry buildings.

A more specific object of the present invention is to gain ready and quick erection of a building structure wall and thereby gain economic advantage from modern construction techniques. In realizing this object of the present invention, a building structure incorporates a structural steel skeleton, including a plurality of load bearing column members which support a roof structure overlying the enclosed area within the building. Primary reliance for support for the roof structure is placed on the column members, rather than upon the space-enclosing wall structure per se. The enclosure of the space defined by the structural steel skeleton of the building is accomplished through the use of precast panels, fitted between adjacent pairs of the column members.

Yet another more specific object of this invention is to simulate the appearance of a handlaid masonry wall through the use of a precast panel particularly formed for use as a wall component.

Some of the objects and advantages of the invention having been stated, others will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

FIG. 1 is an elevation view of a building structure wall in accordance with the present invention;

FIG. 2 is an enlarged section view through a portion of the building structure wall of FIG. 1, taken generally along the line 2—2 in FIG. 1;

FIG. 3 is an enlarged plan view, in partial section, through a portion of the building structure wall of FIG. 1, taken generally along the line 3—3 in FIG. 1;

FIG. 4 is an enlarged elevation view, in partial section, illustrating a form of foundation provided beneath the building structure wall of FIG. 1;

FIG. 5 is a perspective view, from one side, of a precast panel such as is incorporated in the wall of FIGS. 1–4;

FIG. 6 is a reduced elevation view of the reverse side of one form of the panel shown in FIG. 5; and

FIG. 7 is a view similar to FIG. 6 of a second form of the panel.

Referring now more particularly to the drawings, FIG. 1 is an elevation view of a portion of the exterior wall of a light industrial or commercial building, viewed from the exterior of the building. While only a portion of the building wall is shown and will be described hereinafter, it is to be understood at the outset that the method and construction of the present invention will normally be used to enclose substantially the entirety of a building structure, with any minor area being of conventional construction, if so desired. In accordance with the present invention, the roof or other superstructure extending over the space enclosed within the building preferably is supported by a structural steel skeleton including load-bearing column members **10**, two of which are shown in FIG. 1. The column members **10** are of such size, shape, dimensions and relative spacing as to cooperate with other elements in providing a structural steel skeleton for the completed building adequate to bear the load to be imposed thereon. By selection of appropriate conventional shapes, each of the column members **10** has a pair of elongate flanges **11** and **12** (FIG. 3) spaced apart a predetermined distance and defining together with a web portion **14** extending therebetween a pair of channels extending longitudinally of the column member **10**. In erecting the load-bearing structural skeleton for the building, a plurality of column members **10** are supported in predetermined spaced-apart, parallel vertical relation, with adjacent pairs of column members oriented to have the elongate channels defined between the flanges **11** and **12** disposed vertically and in opposing, facing relation. Each column is supported on a suitable footing, preferably a monolithic block of concrete poured in place before erection of the columns, and is isolated from other elements of the building as mentioned hereinafter.

Into the opposing, facing channels of an adjacent pair of load-bearing column members **10** are inserted precast panels **15**. Each panel **15** is a rectangular parallelepiped monolithic body of concrete having a length approximately equal to the center-to-center spacing of the adjacent pair of column members **10**, such as, for example, approximately a 20 foot length. In order to impart to the finished building structure wall an appearance substantially similar to handlaid masonry walls of the type with which industrial and commercial building tenants and buyers are familiar, the panels **15** are cast against a mold which imparts to at least one face surface thereof an appearance simulating the appearance of handlaid masonry. In particular, the surface of panel **15** which is to appear as the exterior surface of a building is cast to have a pattern of grooves therein sized and spaced to give to the face surface of the panel the appearance of courses of face brick, and an uneven texture or surface finish such as that characteristic of fired clay products (FIG. 5). The reverse face of the panel may similarly be marked with grooves therein sized and spaced to impart to that surface of the panel the appearance of courses of concrete block if desired (FIG. 6). However, it is anticipated that the reverse face will be widely accepted when such surface is simply smoothly finished (FIG. 7), and will in fact be preferred in that form for certain applications. In order to impart strength to the panels, suitable reinforcement is embedded therein at the time that the panels are cast, such as conventional welded wire mesh **16** (FIG. 5).

In erecting the precast panels **15** into the elongate channel of an adjacent pair of column members, the panels preferably are lifted and inserted between the columns adjacent the upper extremity of the columns, so that distal end portions of a panel **15** are received within a corresponding pair of the vertically oriented channels (FIGS. 1 and 3). To accomplish such insertion, the precast panel has a thickness at least slightly less than the spacing of the flanges **11** and **12** of the column member **10**. For ease in handling, the height of a given panel **15** preferably is substantially less than the full height of the erected building wall, and may be any readily handled modular dimension, such as for feet. A plurality of such precast panels **15** are stacked one atop the other to provide the required height of the building wall, with joining means formed integrally with the lengthwise side edges of the panels cooperating between engaging upper and lower surfaces of adjacent panels (FIG. 2). Preferably, the joining means comprises an elongate tongue and a mating elongate groove. In order to provide a weather seal between superposed panels **15**, a mastic material or a suitable elastomeric gasket is in-

serted into the tongue and groove joint as panels are stacked within the channels of the column members 10.

The panels 15 are secured into position relative to the column members 10 by means engaging one of the elongate flanges 11, 12 and clamping the panel into engagement with the other flange. Preferably, the clamping means includes elongate angle members 18 extending for at least the height of a panel and secured to one of the flanges of each of the adjacent pair of column members 10 (FIG. 3). Preferably, the angle members 18 are of steel, and are welded in place as the building wall is erected. The angle members 18 are positioned with one leg abutting the flange 12 to which the angle member is secured and the other leg engaging a surface of the panel structure 15 and clamping the same into engagement with the other flange 11 of the column member 10 (FIG. 3). For appearance purposes, it is usually preferred that the angle members 18 be positioned within the space enclosed by the building structure, for engagement with the interior face surface of the panels 15. As the angle members 18 are being welded in position, the panel structures may be temporarily held in place by means such as pairs of wedges 19 (FIG. 3), to be left in place on completion of the wall.

For purposes of sealing against air and precipitation flow into the building around the ends of the panels 15, it is preferred to weather seal the same by interposing a mastic material or elastomeric gasket between distal ends of a panel and the flanges against which the same are to be clamped (FIG. 3), before the wedges and angle members are installed.

The building wall construction described to this point is supported, in relation to the remainder of the building, by a footing arrangement as shown somewhat schematically in FIG. 1 and 4. In such an arrangement, an elongate lintel footing 20 extends beneath the lowermost panel structure 15, to provide support therefor independently of isolated footings 21 for the columns 10 and to define the outer boundaries of a concrete slab floor 22, if such is provided for the interior of the building.

While discussed to this point with reference to a building structure in which the column members 10 are part of a load bearing skeleton of a building structure, it is recognized that the thickness of the panels may be increased and at least a portion of the load distributed thereto. Further, the structure of panels stacked between elongate members may be adapted to interior wall construction as well as to exterior walls.

In the drawings and specification, there have been set forth preferred embodiments of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

We claim:

1. A building structural wall comprising

at least two load-bearing column members supported in predetermined spaced-apart, parallel vertical relationship for providing a structural skeleton for a building, each of said column members having a pair of elongate flanges generally planar spaced apart a predetermined horizontal distance and defining a vertically extending channel of U-shaped cross-sectional configuration oriented in opposing, facing relation to the channel of an adjacent column member,

a plurality of superposed precast concrete panels extending between and having opposite end positions thereof disposed in said channels, said panels forming the entire thickness of the building wall intermediate said adjacent pair of said column members and having one face surface simulating the appearance of handlaid brick,

weather-sealing means interposed between said one face surface of said panels and an adjacent flange of said column members and interposed between superposed panels for blocking flow of air and precipitation through the building wall, and

a pair of elongate angle members, each angle member having first and second legs extending at right angles one to another and being generally symmetrical about a plane bisecting the included angle between the legs, each of said angle members being secured to one of said flanges of a corresponding one of said adjacent pair of column members and extending therealong for at least the full height of at least one of said panels, and each of said angle members having an end of one leg thereof abutting said corresponding one column member flange and the side of the other leg thereof abutting the other face surface of said at least one panel for clamping a corresponding one of said end portions of said at least one panel into engagement with said adjacent flange of said corresponding one column member while distributing the stress of engagement between said angle member and said panel over the side area of said angle member.

2. A method of erecting a building structure wall section comprising the steps of

erecting a load-bearing structural skeleton for a building by supporting a plurality of column members in predetermined spaced-apart, parallel vertical relation and with adjacent pairs of column members oriented to have elongate channels of U-shaped cross-sectional configuration therein disposed vertically and in opposing relation,

forming a plurality of cast concrete panels each having at least one face surface simulating the appearance of handlaid masonry, then

successively inserting each of a plurality of said precast panels into the upper ends of the elongate channels and lowering the panels into edgewise superposition in and between the elongate channels of an adjacent pair of column members to form the entire thickness of a wall section spanning the distance between the pair of column members and to partially enclose the space within the structural skeleton,

inserting weather-sealing means between superposed panels and between said one face surface thereof and the proximate side of the elongate channels, and

clamping each distal end portion of the panels into engagement with the proximal side of a corresponding one of the elongate channels while securing an end of one leg of a bilaterally symmetrical elongate right angular member in abutment with the other side of the corresponding one elongate channel and the side of the other leg of the angular member in abutment with the corresponding panel distal end portion so as to distribute the stress of engagement between the angle member and the panel over the side area of the angle member.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,600,864 Dated August 24, 1971

Inventor(s) Fred O. Godley and Fred D. Godley

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 11, "face brick etc." should be - - face brick for the exterior surface of the wall and concrete block for the interior surface of the wall - -

Column 1, line 14 "a certain" should be - - certain - -

Column 2, line 7, "load-bearing" should be --load bearing--

Column 2, line 19, "load-bearing" should be --load bearing--

Column 2, line 21, "space-apart" should be --spaced apart--

Column 2, line 67, "for" should be - - four- -

Column 3, line 31, "Fig. 1 and 4" should be - - Figs. 1 and 4--

Signed and sealed this 29th day of February 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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